ORIGINAL ARTICLE

ISSN: 3007-4487

SIERRA LEONE JOURNAL OF MEDICINE

The Official Journal of University of Sierra Leone Teaching Hospitals Complex

Journal Homepage: www.sljm.org

Burden and Determinants of Hypertension in Adult Residents of Ekiti State: A Population Based Study

[1]Dele-Ojo B. F., [1]Dada S.A, [1]Adeoti O. A., [1]Raimi T. H., [2]Dada M. U., [3]Solomon O. O., [3]Akinwumi F. A., [4]Babatola A. O., [3]Amu E. O., [5]Solomon O. A., [6]Aibinuomo A. O., [7]Olabanji J. K., [7]Oluwadiya K. S.

[1]Department of Medicine, Ekiti State University Teaching Hospital, Ado-Ekiti, Ekiti State, Nigeria, [2]Department of Psychiatry, Ekiti State University Teaching Hospital, Ado-Ekiti, Ekiti State, Nigeria, [3]Department of Community Medicine, Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria, [4]Department of Paediatrics, Ekiti State University Teaching Hospital, Ado-Ekiti, Ekiti State, Nigeria, [5]Department of Family Medicine, Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria, [6]Department of Monitoring and Evaluation, World Health Organization, Ibadan Chapter, Oyo State, Nigeria, [7]Department of Surgery, Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria.

Corresponding Author: Samuel Ayokunle Dada;ayokunle.dada@eksu.edu.ng

ARTICLE INFO

Article History

Received: May 03, 2024

Accepted: October 29, 2025

Published: November 10, 2025

Corresponding Author:
Samuel Ayokunle Dada

Technical Information

How to Cite: Dele-Ojo B. et al. Burden and Determinants of Hypertension in Adult Residents of Ekiti State: A Population Based Study: SLJM 2025;Vol 2(2) pp 66-72. https://doi.org/10.69524/sljm.v2i2.58

Editor-in-Chief: Prof. Kehinde S. Oluwadiya, University of Sierra Leone Teaching Hospitals Complex, Freetown, Sierra Leone.

Funding: No funding was received for this study.

Ethical Consideration

Conflict of interest: The authors declare they have no conflicts of interest that are directly or indirectly related to the research.

ABSTRACT

Background: Hypertension is the leading risk factor for cardiovascular disease in Nigeria and sub-Saharan Africa, contributing substantially to morbidity and mortality. It is influenced by multiple factors among which are diet, stress, and physical inactivity—all affected during the COVID-19 lockdown. Many individuals faced increased stress due to financial insecurities, restricted access to healthcare, and limited opportunities for physical activity, which are known to contribute to elevated blood pressure.

Objective: This study investigated the burden and the determinants of hypertension in Ekiti State.

Methods: A cross-sectional, multi-stage cluster survey was conducted between June and September 2020 to assess the burden and prevalence of hypertension. Utilising the World Health Organisation STEP-wise approach to chronic disease risk factor surveillance, a representative sample of 3,910 adult residents was selected. Binary logistic regression was employed to identify significant associations between cardiovascular risk factors and hypertension.

Results: Women comprised 73.9% of the study population. Participants' mean age, waist circumference, and body mass index were 43.1 ± 17.1 years, 85.3 ± 12.1 cm, and 25.1 ± 11.3 kg/m^2 respectively. Hypertension prevalence in Ekiti State was 23.4%, with awareness, treatment, and control rates at 36.9%, 29.9%, and 18.7%, respectively. Hypertension determinants included age (45-64 and > 65 years), truncal obesity, and semi-urban/urban residence. Regular moderate-intensity exercise was associated with a lower likelihood of hypertension, although not statistically significant.
In the multivariate regression analysis, hypertension determinants included age (45-64 years) [AOR = 32.42; C.I 95%: (23.51-44.69) p <0.001], age (> 65 years) [AOR = 44.71; C.I 95%: (30.28 - 66.00) p <0.001], Primary Education [AOR = 0.69; C.I 95%: (0.48 - 0.99) p = 0.042], increased waist circumference [AOR = 1.80; C.I 95%: (1.37 - 2.35) p<0.001], Semi-Urban[AOR = 1.66; C.I 95%: (1.26 - 2.19) p<0.001] and Urban [AOR = 1.66; C.I 95%:(1.20 - 2.30) p = 0.002.

Conclusion: The prevalence of hypertension in Ekiti State is lower than the national average, and its determinants include advancing age, primary education, truncal obesity, and semi-urban/urban residence. This calls for scaling up public health interventions for controlling hypertension targeted at those living in Ekiti, Nigeria.

Key words: Awareness, Cardiovascular disease, Hypertension, Prevalence, Ekiti State.

1. INTRODUCTION

Hypertension is the leading cause of cardiovascular disease and premature death worldwide. It is the most important risk factor for cardiovascular diseases such as stroke, heart failure, and ischemic heart disease leading to substantial morbidity and mortality, particularly in Nigeria and sub-Saharan Africa[1,2]. The increasing prevalence of hypertension as well as the poor rate of awareness, treatment and control in low and middle-income countries (LMICs) poses a critical public health challenge[3,4]. Globally, approximately 31.1% of adults (1.39 billion individuals) were estimated to have hypertension in 2015, with a higher prevalence observed in LMICs (31.5%, 1.04 billion people) compared to

high-income countries (28.5%, 349 million people)[5]. Projections indicate a potential 60% increase in the number of adults with hypertension by 2025, reaching a staggering 1.56 billion (1.54–1.58 billion)[6].

Hypertension prevalence correlates with age, affecting over 60% of individuals beyond the age of 60 years. Specifically, previous national surveys reported a 38.1% prevalence[7] while more recent studies indicated 28.9% in Nigeria[8]. Notably, within Ekiti State, localized studies reported varying prevalence rates, such as 33.0% in a specific age group,[4] 55.5% in semi-urban communities[3], and 66.4% in a single rural setting with an older population (mean age of 66.77 years)[9]. However, these studies were either confined to specific regions or lacked standardization, creating a knowledge gap for informing comprehensive health policies aimed at alleviating the hypertension burden in the State. This research aimed to provide a comprehensive assessment of the true burden and determinants of hypertension in Ekiti State.

2. PATIENTS AND METHODS

A cross-sectional, household-based survey using a four-stage multistage sampling design and the World Health Organisation (WHO) -STEPS survey manual was conducted from July to September 2020. It was a non-communicable disease (NCD) study conducted as part of the Ekiti State COVID-19 survey[10]. Ekiti State is located in the southwest zone of Nigeria. It has a population figure of 2,384,212 (2006 census), with Ado Ekiti being the State capital. The state has three senatorial districts: Ekiti Central, Ekiti North, and Ekiti South Senatorial District; 16 local government areas and 176 wards, comprising 2,457 settlements as of 2016.[11]

Respondents aged 18 years were randomly selected. All households in Ekiti State were eligible for inclusion in the study. The study recruited 4,726 individuals into the COVID-19 and NCD survey. However, those who were less than 18 years of age were removed from the data on hypertension leaving 3,910 adult residents in Ekiti State. Participants were recruited between 9.00 am to 2.00 pm daily throughout the period of the study, which was conducted as a part of the Ekiti State coronavirus disease 2019 (COVID-19) survey. Details of the protocol have been described elsewhere[10].

2.1 Inclusion and Exclusion Criteria

The inclusion criteria were a self-reported age of 18 years or older and a duration of stay in the community for a minimum of 12 months. The exclusion criteria were mental illness/dementia, unwillingness to consent. Participants were excluded from the study if they were ill, unwilling to provide consent, or if obtaining samples for testing was difficult or impossible.

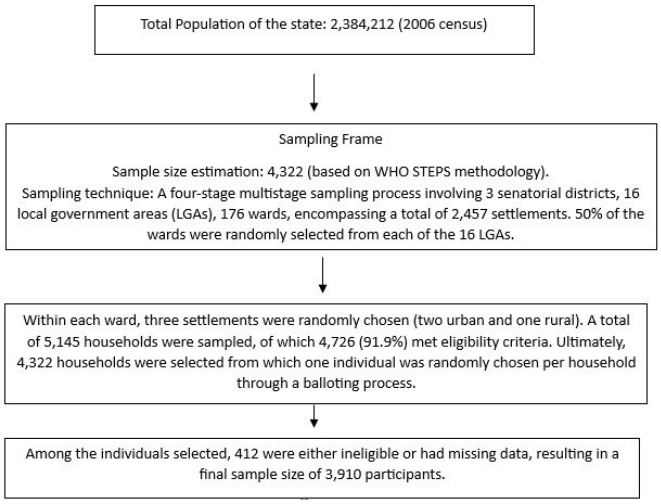

Figure1: Recruitment of Participants in the Study

2.2 Sample Size

This was based on the World Health Organisation (WHO) STEPS Manual which adjusts for the number of age groups and gender estimates, design effect, and estimated non-response. The World Health Organisation provides a Microsoft Excel spreadsheet for calculating sample sizes based on the methodology. With this, we estimated the sample size to be 4321.8, which we rounded up to 4,322.

2.3 Sampling Technique

A four-stage multistage sampling technique was used. All the 16 local government areas (LGAs) in Ekiti State were sampled. For the first stage sampling, 50% of the wards within each LGA were randomly selected. The urban/semi-urban/rural distribution of selected wards was proportional to their population distribution in the 2006 census.[11] Following the first stage sampling, a list of all settlements within the selected wards was compiled, and three settlements were randomly selected from each ward using a list of computer-generated random numbers. In the third stage, 4322 households were selected for the enumeration. Finally, one individual from each selected household was randomly picked for enrolment by balloting in the survey for the fourth stage.

2.4 Advocacy/Community Entry

Before the survey teams began their fieldwork in each selected ward/settlement, we conducted community-level mobilisations. Community mobilisation teams visited each settlement 1–2 weeks before the initiation of fieldwork, working with community health workers to meet key gatekeepers in the communities. The community leaders were consulted and provided with information about the purpose of the survey to share with their community members. In addition, for each settlement, targeted radio announcements were made 1-2 days prior to the visit to the settlement, and town criers in the community were commissioned to announce the event on the day before and on the morning of the survey.

2.5 Classification of Study Areas/ Definition of Urban and Semi-Urban Settings

The study locations were classified as either urban or semi-urban for comparative analysis. This classification was based partly on Nigeria General Household Survey-Panel (Wave 5) 2023/2024 report by the Nigerian National Bureau of Statistics.

Our specific criteria were as follows:

Urban Areas: We defined urban areas as the state capital (Ado-Ekiti) and the headquarters of the 15 other Local Government Areas (LGAs) in the state and/or including the following characteristics:

Administrative Function: Serving as an LGA headquarters.

Population Density: High population concentration.

Infrastructure: Presence of key infrastructure such as a tertiary hospital (e.g., Ekiti State University Teaching Hospital), state secretariat complexes, paved road networks, and centralised markets.

Service Availability: Access to a high density of financial institutions, secondary and tertiary educational institutions, and government offices.

Semi-Urban Areas: We defined semi-urban areas as developed

peri-urban towns and major settlements that are not LGA headquarters. These areas exhibit a mix of urban and rural characteristics:

Population and Density: Significant population size but lower density than LGA headquarters. Infrastructure: Presence of some basic infrastructure such as tarred roads, regular electricity supply, and a general hospital or comprehensive health centre, but less dense than in urban centres.

Economic Activity: A blend of commercial and agricultural activities. Towns such as Iyin-Ekiti, Ijan-Ekiti and Ode-Ekiti which are prominent and well-developed but do not serve as LGA capitals fall into this category.

By using the administrative definition of LGA headquarters as a proxy for urban and identifying other significant towns with developed infrastructure as semi-urban, we employed a reproducible and contextually appropriate method for our state-wide screening in Ekiti State.

2.6 Procedure and Measurements

Using the adapted WHO STEP-wise approach to chronic disease risk factor surveillance questionnaire, data on age, sex, education and other demographic characteristics were collected. The history of previous diagnosis, treatment and control of blood pressure among those with hypertension was obtained.

Anthropometric and blood pressure measurements. Anthropometric parameters were determined according to standard protocols. We measured the weight (kilograms) and height (meters) of participants with Seca 878 weighing scales and wall-mounted portable stadiometers respectively. The body mass index (BMI) was calculated using the formula, weight/height.[2] Rural, Semi-urban and urban communities were strictly defined by population.

Blood Pressure (BP) Measurement: The BP was measured using OMRON® M3 digital sphygmomanometers with the patients sitting after 5 minutes of rest, with the cuff around the upper arm. Blood pressure was measured three times and the average of the last two readings was used.

Table 1: Socio-Demographic and Biophysical Characteristics of the Study Participants

Variable	Frequency N = 3910	Percentage (%)
Age Group (In Years)		
18 – 44	2320	59.3
45 – 64	976	25.0
65 and above	614	15.7
Mean Age; *Mean ± SD*	43.1 ± *17.1*	
Age Range (Years)	18 – 102	
Gender		
Male	1022	26.1
Female	2888	73.9
Education		
None	530	13.6
Primary	1146	29.3
Secondary	1530	39.1
Tertiary	704	18.0
Income		
< 50,000 Naira	1898	48.5
≥ 50,0000 Naira	2012	51.5
WC (cm), *Mean ± SD*	85.3 ± 12.1	
BMI (kg/m²); *Mean ± SD*	25.1 ± 5.3	
SBP; *Median ± IQR*	24.7 ± 4.0	
DBP; *Median ± IQR*	78.0 ± 8.0	

Keys: SD, standard deviation; WC, waist circumference; BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; IQR, interquartile range

The Level of Physical Activity: This was assessed based on the engagement in moderate to intense exercise like cycling, swimming, running, jogging, skipping, brisk walking etc, for at least 30 minutes a day for a minimum of 5 days a week. Those who met the above World Health Organisation criteria (150 minutes of cumulative exercise weekly) were considered by the study to be physically active and those who did not meet the criteria were considered inactive.

Adequate Fruit and Vegetable Intake: The respondents who consumed at least three to five servings of fruits (a medium-sized common fruit = 1 serving) or vegetables (half cup of cooked or raw vegetable = 1 serving) in a day were considered as having adequate intake.

2.7 Outcome Measures

The main outcome measures in this study were hypertension, awareness of hypertension, treatment of hypertension, and control of hypertension. Hypertension was defined as a BP of ≥140/90 mm Hg and or the current use of antihypertensive medications. Awareness of hypertension was defined as a self-reported prior diagnosis by a doctor or a certified health worker, excluding women diagnosed with hypertension during pregnancy. Treatment of hypertension was defined as self-reported medication use to lower blood pressure at the time of the interview. Control of hypertension was defined as an SBP below 140 mm Hg and a DBP below 90 mm Hg while currently on antihypertensive medication.

In this study, significant smoking was defined as a self-reported regular and current history of tobacco use. Similarly, significant alcohol consumption was defined as any self-reported regular and current intake of alcoholic beverages.

Truncal obesity was defined as waist circumference > 94 cm in men and > 80 cm in women.

2.8 Informed Consent

Written informed consent was obtained from the participants. This was presented in both Yoruba (the local language) and English. This included all elements of informed consent required by the National Health Research Ethics Committee (NHREC) code of

Table 3: Relationships Between Sociodemographic Characteristics and Hypertension

Variable	Hypertension Yes n (%)	No n (%)	Chi Square	p-Value
Age Group (In Years)				
18 – 44	83 (3.6)	2237 (96.4)	1260.439	<0.001*
45 – 64	489 (50.1)	487 (49.9)		
65 and above	344 (56.0)	270 (44.0)		
Gender				
Male	253 (24.8)	769 (75.2)	1.361	0.243
Female	663 (23.0)	2225 (77.0)		
Education				
None	254 (47.9)	276 (52.1)	279.652	<0.001*
Primary	320 (27.9)	826 (72.1)		
Secondary	209 (13.7)	571 (86.3)		
Tertiary	133 (18.9)	571 (81.1)		
Income				
< 50,000 Naira	438 (23.1)	1460 (76.9)	0.252	0.616
≥ 50,0000 Naira	478 (23.8)	1534 (76.2)		

Key: *= statistically significant (P<0.05

Table 2: Key Proportions of Prevalence of Hypertension, Awareness, Treatment and Control in the Study Population

Total Participants. (N)	Proportion of Hypertensive, n (%)	Proportion Aware of their Hypertensive Status, n (%)	Proportion of Hypertensives, on Treatment, n (%)	Proportion of All Hypertensives Controlled, n (%)	Proportion of Controlled on Treatment, n (%)
3,910	916 (23.4)	338 (36.9)	274 (29.9)	171 (18.7)	171 (62.4)

conduct for the participant to make an informed decision about whether or not to participate. Verbal consent was obtained from illiterate individuals because electronic devices were used for data collection.

2.9 Ethical Consideration

Ethical approval for this study was obtained from the Ekiti State University Teaching Hospital Ethics Committee, Ado Ekiti, Ekiti State, Nigeria (EKSUTH/A67/2020/07/002).

2.10 Data Analysis:

Data was analysed using IBM SPSS version 25 for Windows (IBM Corp., Armonk, NY). In addition, descriptive statistics for univariate analysis and multivariate analysis were conducted to investigate relationships between cardiovascular risk factors (such as cigarette smoking, intake of fruits/vegetables, physical exercise, waist circumference, body mass index and settlement) and hypertension. A binary logistic regression model was fitted to identify the determinants of hypertension, which included advancing age, primary education, truncal obesity, and semi-urban/urban residence. Adjusted odds ratios were calculated with 95% confidence intervals (CIs). P-values less than 0.05 were deemed statistically significant.

Table 4: Relationships Between Cardiovascular Risk Factors and Hypertension

Variable	Hypertension Yes n (%)	No n (%)	Chi Square	P-Value
Smoking				
Yes	3 (27.7)	94 (72.3)	1.364	0.243
No	880 (23.3)	2900 (76.7)		
Alcohol				
Yes	237 (25.0)	710 (75.0)	1.782	0.182
No	679 (22.9)	2284 (77.1)		
Consumption of Fruits/Vegetables				
Adequate	188 (22.6)	643 (77.4)	0.380	0.538
Inadequate	728 (23.6)	2351 (76.4)		
Extra Salt				
Yes	567 (23.3)	1867 (76.7)	0.063	0.802
No	349 (23.6)	1127 (76.4)		
Adequate Physical exercise				
Yes	25 (15.0)	142 (85.0)	6.955	0.008*
No	891 (23.8)	2852 (76.2)		
Waist Circumference (n=2915)				
High	406 (25.5)	1186 (74.5)	22.702	<0.001*
Low	240 (18.1)	1083 (81.9)		
BMI				
Underweight	38 (16.2)	196 (83.8)	12.630	0.006*
Normal Weight	448 (22.5)	1547 (77.5)		
Overweight	266 (25.0)	797 (75.0)		
Obese	164 (26.5)	454 (73.5)		
Settlement				
Rural	161 (20.0)	643 (80.0)	16.163	<0.001*
Semi-Urban	461 (26.4)	1286 (73.6)		
Urban	294 (21.6)	1065 (78.4)		

Key: * = statistically significant (P<0.05)

3. RESULT

A total of 3,910 participants with a mean age of 43.1 ± 17.1 years were included in the study. Initially, 4,726 individuals were recruited into the COVID-19 and Non-Communicable Disease (NCD) survey; however, individuals below 18years of age were excluded from the hypertension analysis, resulting in a final sample of 3,910 adult residents of Ekiti State.

Table 1 presents the socio-demographic and biophysical characteristics of the study participants. The majority of the participants were women, accounting for 2,888 (73.9%) of the sample. The predominant age group was 18-44 years, comprising 2,320 individuals (59.3%). The mean waist circumference was 85.3 ± 12.1 cm, while the mean body mass index (BMI) was 25.1 ± 5.3 kg/m^2. The median systolic blood pressure (SBP) was 124.7 mmHg (IQR: 4.0), and the median diastolic blood pressure (DBP) was 78.0 mmHg (IQR: 8.0). The overall prevalence of hypertension was 23.4% (n = 916).

Table 2 summarises key hypertension-related proportions, including prevalence, awareness, treatment, and control. Among individuals with hypertension, 338 (36.9%) were aware of their hypertensive status before the study. Additionally, 274 (29.9%) were undergoing treatment for hypertension, while 171 (18.7%) had achieved blood pressure control.

Tables 3 and 4 illustrate the relationships between sociodemographic characteristics, cardiovascular risk factors, and hypertension. Table 5 outlines the determinants of hypertension identified in the study. Multivariable logistic regression analysis revealed that advancing age, completion of primary education, truncal obesity, and residence in semi-urban or urban areas were significantly associated with an increased risk of hypertension.

4. DISCUSSION

Hypertension is the leading risk factor for cardiovascular disease in Nigeria and sub-Saharan Africa, contributing substantially to morbidity and mortality. This study determined the prevalence and determinants of hypertension in Ekiti State during the COVID-19 lockdown. The prevalence of hypertension among adults in Ekiti was found to be 23.4%. Notably, this study is the first state-wide study on hypertension in Ekiti state. However, compared to the national prevalence, the hypertension rate among Ekiti is lower among residents in Ekiti State. The prevalence in this study is in tandem with 23.1%[12] and 23.2%[13] in previous studies of similar age by Oyeyemi et. al. and Ugwuuja et al., respectively. Omotoye et al., reported a 33.0% prevalence in a similar age group but their study was limited to only six out of the sixteen local government areas in the state[4]. Ogunmola et al., reported a 66.4% prevalence in an older population, with a mean age of 66.8 years from a single rural setting.[9] Conversely, Olamoyegun et al., in 10 semi-urban communities in Ekiti State reported a 55.5% prevalence with a

Table 5: Determinants of Hypertension in the Study

Variable	AOR	95% Confidence Interval		p-value
		Lower	Upper	
Age Group (In Years)				
18 – 44 (ref)	1.00			
45 – 64	32.42	23.51	44.69	<0.001*
65 and Above	44.71	30.28	66.00	<0.001*
Education				
None	0.76	0.50	1.14	0.178
Primary	0.69	0.48	0.99	0.042*
Secondary	0.74	0.51	1.07	0.109
Tertiary (ref)	1.00			
Adequate Exercise				
Yes	1.00			
No (Ref)	1.33	0.69	2.55	0.393
Waist Circumference				
High (Ref)	1.80	1.37	2.35	<0.001*
Low	1.00			
BMI				
Underweight (Ref)	1.00			
Normal Weight	1.19	0.73	1.94	0.477
Overweight	1.25	0.73	2.15	0.423
Obese	1.35	0.76	2.41	0.307
Settlement				
Rural (Ref)	1.00			
Semi-Urban	1.66	1.26	2.19	<0.001*
Urban	1.66	1.20	2.30	0.002*

Keys: AOR- adjusted odds ratio, ref- reference category. CI: confidence interval; BMI: body mass index, *=statistically significant (P<0.05).

mean age of 61.7 years. The low prevalence in this study could be attributable to the lower mean age as compared to the previous studies in the Ekiti State. Moreso, the non-representativeness of the previous studies in the State was evident in their limited coverage. This may also explain the difference between our results and theirs[3, 4, 9]. Advanced age has been well-documented to be associated with an increasing prevalence of hypertension[6, 14, 15]. Our study featured a large sample size and incorporated rural, semi-urban, and urban populations, ensuring a comprehensive representation across various regions across 16 local governments[10,11]. Findings from studies in other parts of the country, including a national survey, appear to reinforce our results. For instance, Adeloye et al., in a systematic review of hypertension literature spanning 1995 to 2021, presented a pooled analysis of mean blood pressure in Southwest Nigeria (including Ekiti), revealing a prevalence of 30.2%[8].

Moreover, this study revealed a higher female preponderance. Attributing the male-to-female disparity is partly due to its timing during the COVID-19 lockdown. This study was a statewide household survey of the prevalence of COVID-19 and other non-communicable diseases in the state. Initially, the study recruited 4,726 individuals into the COVID-19 and NCD survey. However, those who were less than 18 years of age (mostly males) were excluded from the data on hypertension, leaving 3,910 adult residents in Ekiti State. Additionally, during the COVID-19 lockdown, financial insecurities led many adult men to be away from home early to meet their families' needs.

Existing literature remains inconclusive regarding gender-specific hypertension prevalence in Nigeria, as it is unclear which gender is more affected. In line with some prior studies in Nigeria, we observed no significant difference in hypertension prevalence between sexes. However, some other studies suggest that men generally exhibit higher blood pressure than women across all age groups, with a slight increase in hypertension prevalence among older women[16,17]. Notably, a high proportion of individuals with hypertension in Ekiti State were unaware of their hypertensive status (63.1%), untreated (70.1%), and uncontrolled (81.3%). The awareness rate of 36.9%, treatment rate of 29.9%, and controlled BP rate of 18.7% in our study indicate a greater burden of hypertension compared with the findings by Olamoyegun et al., who reported awareness, treatment, and controlled BP rates of 26%, 10.9%, and 22%, respectively.

Similarly, a previous study by Adeloye et. al[8]. reported an awareness rate of 29.0% and a treatment rate of 12.0%. This is indicative of widespread problems with awareness of BP as a disease within the community and also of poor adherence to treatment for hypertension. Given that hypertension is mostly asymptomatic until it begins to have end-organ effects, it underscores the importance of health education about routine health checks and encouraging treatment adherence.

In this study, increasing age, primary education, truncal obesity, physical inactivity and semi-urban/urban residence were all significantly associated with an increased risk of hypertension. This aligns with previous studies that reported advancing age and urban residency were associated with hypertension[16,18]. This study found that living in a semi-urban or urban setting was associated with hypertension, similar to a previous study that found the prevalence of hypertension to be high in the semi-urban communities in Ekiti State[3,8]. Mass migration of rural residents to semi-urban and urban areas in search of job opportunities and better living conditions and unhealthy lifestyle changes (diet and sedentary lifestyle) could account for the rising prevalence of hypertension.

Moreover, this study found low educational status as a determinant of hypertension, in tandem with previous studies [19,20,21]. Furthermore, individuals with abdominal obesity had a significantly higher risk of developing hypertension than those without abdominal obesity regardless of their engagement in high or moderate-intensity physical activity, as also previously documented[22, 23]. Waist circumference, which is also a measure of abdominal obesity was found to have an association with the development of hypertension based on a large nationwide population-based cohort study in Korea[24].

4.1 The Strengths of this Study:

It has a larger sample size and it is the most extensive, which spans across the entire state and proportionally represents both urban and rural communities. It was carried out during the COVID-19 pandemic/lockdown, which mimicked a state of war.

4.2 Limitations:

The disparity in the male-to-female ratio is a limitation of this study.

4.3. Recommendations to Reduce the Burden of Hypertension in Ekiti State:

1. These results suggest that opportunistic screening can identify significant numbers with hypertension. Hence, there is a need to incorporate regular and compulsory BP check into workplaces, marketplaces, places of worship and political gatherings.

2. There is a need to scale up public health promotion programs on healthy lifestyle choices that target reduction of truncal obesity

through healthy diet with physical exercise, possibly using local languages, as those with primary education are more at risk of developing hypertension.

4.3 Conclusions

The prevalence of hypertension in Ekiti State is lower than the national average. Hypertension was found to be more prevalent among those with primary school education, truncal obesity, those in the age category (45-64 and > 65 years), and those who reside in semi-urban/urban residences. This calls for scaling up of public health interventions for controlling hypertension targeted at those living in semi-urban/urban residence, middle-aged/elderly, those with low education and truncal obesity.

Author Contributions:

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept, design, acquisition, analysis, or interpretation of data: Bolade Dele-Ojo, Samuel Dada, Adekunle Adeoti, Taiwo Raimi, Mobolaji Dada, Oluremi Solomon, Femi Akinwumi, Adefunke Babatola, Eyitope Amu, Olusoji Solomon, Ayomide Aibinuomo, Jimoh Olabanji, Kehinde Oluwadiya.

Drafting of the manuscript: B. F. Dele-Ojo

Critical review of the manuscript for important intellectual content: Bolade Dele-Ojo, Samuel Dada, Adekunle Adeoti, Taiwo Raimi, Mobolaji Dada, Oluremi Solomon, Femi Akinwumi, Adefunke Babatola, Eyitope Amu, Olusoji Solomon, Ayomide Aibinuomo, Jimoh Olabanji, Kehinde Oluwadiya.

Funding:

The Ekiti State Government funded this work through the COVID-19 Resource Response Mobilisation Committee (RRMC).

Acknowledgements:

We acknowledged the following people who participated in the design and data gathering during the survey: Mrs. Oyebola Adeniyi, Mr. Samson O. Dada, Dr. Adebayo Fashola, Dr. Joyce Adebayo, Mr. Victor A. Onwu, Mr. Segun Adebayo, Mrs. Alowooye Bosede, Prof. Abayomi Fadeyi, and Dr. Eyitayo Emmanuel. Dele-Ojo Bolade Folasade and Dada Samuel Ayokunle contributed equally as co-first authors.

Conflict of Interest:

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this paper.

Data Availability Statement:

The data that support the findings of this study are freely available on OSF at https://osf.io/epzjk

REFERENCE

1. Kolo PM, Jibrin YB, Sanya EO, Alkali M, Peter Kio IB, Moronkola RK. Hypertension-related admissions and outcome in a tertiary hospital in northeast Nigeria. Int J Hypertens 2012;2012:960546.
2. Karaye K, Nashabaru I, Fika G, Ibrahim D, Maiyaki B, Ishaq N, et al. Prevalence of traditional cardiovascular risk factors among Nigerians with stroke: cardiovascular topics. Cardiovac J Afr. 2007;18:290-4.
3. Olamoyegun MA, Oluyombo R, Iwuala SO, Asaolu SO. Epidemiology and patterns of hypertension in semi-urban communities, south-western Nigeria. Cardiovac J Afr. 2016;27:356-60.
4. Omotoye FE, Sanusi RA. Prevalence of hypertension among adults in Ekiti state, Nigeria. Int J Health Sci Res 2016;6:241-7.
5. Mills KT, Stefanescu A, He J. The global epidemiology of hypertension. Nat Rev Nephrol 2020;16:223-37.
6. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. Lancet 2005;365:217-23.
7. Odili AN, Chori BS, Danladi B, Nwakile PC, Okoye IC, Abdullahi U, et al. Prevalence, Awareness, Treatment and Control of Hypertension in Nigeria: Data from a Nationwide Survey 2017. Global heart 2020;15:47-.
8. Adeloye D, Owolabi EO, Ojji DB, Auta A, Dewan MT, Olanrewaju TO, et al. Prevalence, awareness, treatment, and control of hypertension in Nigeria in 1995 and 2020: A systematic analysis of current evidence. J Clin Hypertens (Greenwich) 2021;23:963-77.
9. Ogunmola OJ, Olaifa AO, Oladapo OO, Babatunde OA. Prevalence of cardiovascular risk factors among adults without obvious cardiovascular disease in a rural community in Ekiti State, Southwest Nigeria. BMC Cardiovasc Disord 2013;13:89.
10. Oluwadiya KS, Dada M, Aibinuomo AO, Alowooye B, Ariyo OE, Adelekan A, et al. EKITI STATE COVID-19 AND NCD SURVEY. 2021.
11. NBoS. National Population Census. National Population Commission. 2006.
12. Ogah OS, Okpechi I, Chukwuonye II, Akinyemi JO, Onwubere BJ, Falase AO, et al. Blood pressure, prevalence of hypertension and hypertension related complications in Nigerian Africans: A review. World journal of cardiology 2012;4:327-40.
13. Ogah OS, Rayner BL. Recent advances in hypertension in sub-Saharan Africa. Heart 2013;99:1390-7.
14. August P, Oparil S. Hypertension in women. J Clin Endocrinol Metab 1999;84:1862-6.
15. Olanrewaju TO, Aderibigbe A, Chijioke A, Sanya EO, Busari OA, Kolo PI, et al. Descriptive analysis of blood pressure control among treated hypertensive patients in a tertiary hospital in Nigeria. Afr J Med Med Sci 2011;40:207-12.
16. August P. Hypertension in men. J Clin Endocrinol Metab 1999;84:3451-4.
17. Dai B, Addai-Dansoh S, Nutakor JA, Osei-Kwakye J, Larnyo E, Oppong S, et al. The prevalence of hypertension and its associated risk factors among older adults in Ghana. Front Cardiovasc Med. 2022;9:990616.
18. Osamor PE, Owumi BE. Factors associated with treatment compliance in hypertension in southwest Nigeria. J. Health, Pop-

ul. Nutr 2011;29:619.

19. Steyn K, Bradshaw D, Norman R, Laubscher R. Determinants and treatment of hypertension in South Africans: the first Demographic and Health Survey. S Afr Med J 2008;98:376-80.

20. Cheong A, Sazlina S-G, Tong S, Azah AS, Salmiah S. Poor blood pressure control and its associated factors among older people with hypertension: a cross-sectional study in six public primary care clinics in Malaysia. Malays Fam Physician 2015;10:19.

21. Zhao Y, Qin P, Sun H, Liu Y, Liu D, Zhou Q, et al. Metabolically healthy general and abdominal obesity are associated with increased risk of hypertension. Bri J Nutr 2020;123:583-91.

22. Amole IO, OlaOlorun AD, Adesina SA, Odeigah LO. The prevalence of abdominal obesity and hypertension amongst adults in Ogbomoso, Nigeria. Afr J Prim Health Care Fam Med 2011;3:1-5.